

AMENDMENTS TO THE CLAIMS

1. (original) An assist apparatus for electric-powered power steering apparatus having a torque sensor, assist shaft, worm wheel, worm shaft, elastic force application means and an electric motor, comprising first to fourth bearings and wherein the torque sensor is located around the steering shaft or pinion; the assist shaft is one of the steering shaft, the pinion shaft and a sub-pinion; the worm wheel is fastened around either one of the steering shaft, pinion and sub-pinion; the worm shaft has a worm gear that meshes with the worm wheel; the electric motor comprises a rotating shaft, a rotor that is located on the outer-diameter side of the rotating shaft, and a stator that is located such that it faces the rotor in the radial direction; and the rotating shaft and worm shaft are connected to each other by way of a toothed joint or elastic member, wherein the first bearing supports inside the casing the end section of the rotating shaft on the opposite side from the worm shaft; the second bearing supports inside the casing the portion between the joint, which connects the worm shaft and the rotating shaft, and the rotor; the third bearing supports the end of the worm shaft on the side of the rotating shaft inside the gear housing such that the worm shaft can free tilt within a specified range; and the fourth bearing supports the end of the worm shaft on the opposite side from the rotating shaft inside the gear housing, wherein a clearance in the radial direction is provided between either the outer peripheral surface of the outer race of the fourth bearing and the inner surface of the gear housing, or between the inner peripheral surface of the inner race of the fourth bearing and the outer peripheral surface of the worm shaft, wherein the elastic-force application means comprises an elastic member having a variable spring constant that can be changed from a low spring constant of 1 N/mm to 20 N/mm to a high spring constant of 180 N/mm or more, and located between the fourth bearing and gear housing, between the fourth bearing and the worm shaft and/or between the gear housing and the worm shaft so as to apply an elastic force corresponding to the radial displacement of the worm shaft, wherein when not driven by the electric motor, the elastic force having a low spring constant applies a pre-load to parts of the toothed surfaces of the worm and worm wheel to bring them into contact; and when driven by the maximum output of the electric motor and the worm shaft is moved in the direction going away from the worm wheel by the reaction force applied to the worm shaft from the worm wheel, with the area of meshing moved just 0.1 mm to 1.0 mm in the radial direction of the worm shaft with respect to when not driven, the elastic force having a